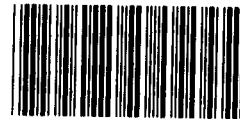


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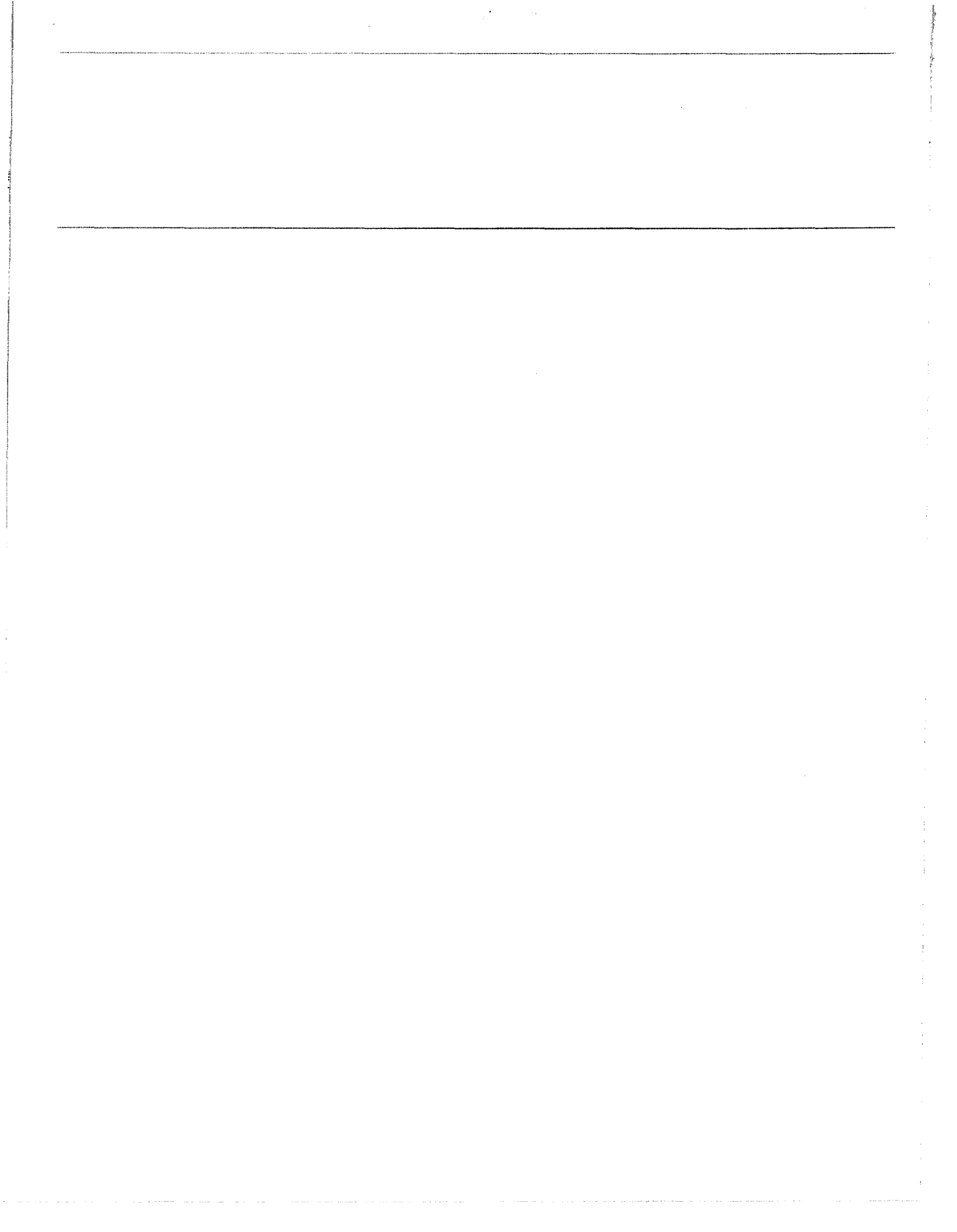
March 1991

SHIP MAINTENANCE

The Navy's Fleet Modernization Program



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United States
General Accounting Office
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National Security and
International Affairs Division

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The Honorable John P. Murtha
Chairman, Subcommittee on Defense
Committee on Appropriations
House of Representatives

The Honorable Daniel K. Inouye
Chairman, Subcommittee on Defense
Committee on Appropriations
United States Senate

As requested, this report presents the results of our examination of the Navy's Fleet Modernization Program. This program is the Navy's primary vehicle for updating the offensive, defensive, and operating systems installed on each of its ships. During fiscal years 1986 through 1990, the Navy allocated about \$6.7 billion to the program. The program's goals are to (1) improve ships' capabilities and material condition, (2) increase fleet readiness by improving standardization of ships, and (3) improve the safety, reliability, repairability, and habitability of ships and equipment.

We found that the Navy did not routinely measure the results of the Fleet Modernization Program or maintain accurate records on the installation status of planned improvements. Consequently, its management information system did not provide timely information to support planning, programming, budgeting, executing, and evaluating the program.

We are sending copies of this report to appropriate congressional committees, the Secretaries of Defense and the Navy, and the Director of the Office of Management and Budget. We will also make copies available to others.

Please contact me at (202) 275-6504 if you or your staff have any questions concerning this report. Major contributors to this report are listed in appendix VII.

Martin M Ferber
Director, Navy Issues

Executive Summary

Purpose

The Congress appropriates billions of dollars to maintain and modernize the Navy's ships. The Fleet Modernization Program is the Navy's primary vehicle for updating the offensive, defensive, and operating systems installed on each of its ships. From fiscal years 1986 through 1990, the Navy's ship modernization budget totaled about \$6.7 billion. The Chairmen of the Subcommittees on Defense, House and Senate Committees on Appropriations, asked GAO to examine the Fleet Modernization Program to provide information on

- the frequency of and reasons for changes in the schedule of ships to be modernized from the Navy's budget submission to the Congress,
- the number of ship alterations included in the Navy's budget that were actually installed, and
- the reasons for any problems or delays in completing ship modernization work.

Background

The Navy's Fleet Modernization Program involves planning, programming, budgeting, and installing military and technical improvements in ships of the active and reserve fleets. The program's goals are to (1) improve ships' capabilities and material condition, (2) increase fleet readiness by improving standardization of ships, and (3) improve the safety, reliability, repairability, and habitability of ships and equipment.

For this review, GAO selected the fiscal year 1987 Fleet Modernization Program because it was the most recent year for which a substantial portion of the modernization projects had been accomplished. (Since large, complex projects can take several years to complete, many projects in the fiscal year 1987 program were not completed until 1989 and 1990.) The Navy requested \$1.6 billion for the Fleet Modernization Program in its fiscal year 1987 budget request. Most funds were needed for the design and installation of more complex modernization projects called "Title K" ship alterations (K-alts). The Navy's fiscal year 1987 program included 2,278 K-alts to be installed on 244 ships at a cost of about \$958 million, as of January 1986 when the Navy's budget was submitted to the Congress.

Results in Brief

Many ships scheduled for modernization as part of the fiscal year 1987 Fleet Modernization Program were rescheduled as part of another year's program or canceled because of changes to ships' deployment schedules. Others were added to the program's schedule after the Navy's fiscal year 1987 budget was submitted to the Congress. However, GAO was

unable to determine the reasons for many of the changes in the program's schedule because central records were not maintained.

About 29 percent of the 2,278 ship modernization projects included in the Navy's fiscal year 1987 budget were not installed as part of that year's program. Although some of these projects may have been installed as part of other years' modernization programs, GAO was unable to determine this information from Navy records.

Delays in completing modernization projects, one-half of them over 1 month long, contributed to deployment delays for about 32, or 13 percent, of the ships included in the fiscal year 1987 program. Most of the delays involved problems with the design of the modernization and material availability.

The Navy does not routinely measure the results of its Fleet Modernization Program or maintain accurate and complete information on the status of planned ship modernization projects. Its management information system does not provide timely information to managers for planning, programming, budgeting, executing, and evaluating the program. Also, the Naval Sea Systems Command does not provide annual briefings to the Chief of Naval Operations' Executive Board on the results of the Fleet Modernization Program, as required by a Navy instruction.

Principal Findings

The Navy Made Many Changes to Its Ship Modernization Schedule

The Navy made many changes to the schedule of the fiscal year 1987 Fleet Modernization Program. Of the 244 ships included in the fiscal year 1987 program, modernization work on 32 ships, or 13 percent, was canceled or moved to another year's program. An additional 53 ships were added to the fiscal year 1987 program after the Navy submitted its fiscal year 1987 budget to the Congress.

Many Planned Projects Were Not Installed

Of the 2,278 modernization projects included in the Navy's fiscal year 1987 Fleet Modernization Program, about 29 percent, or 666, were not installed as part of the program. These projects amounted to about \$193 million of the \$958 million budgeted. Although some of these projects may have been installed as part of other years' programs, GAO

could not determine whether the work was performed in other years because of inadequacies in the Navy's management information system.

**Delays and Other
Modernization Program
Problems**

Delays in completing modernization work, mostly due to deficient plans, contributed to deployment delays for 32, or 13 percent, of the ships included in the fiscal year 1987 program. Over one-half of the delays were longer than 1 month, and three ships were delayed more than 5 months.

In addition, nine frigates were decommissioned in fiscal years 1988 and 1989 after the Navy had spent about \$9.9 million installing new equipment on them. When most of these ships were later leased at no cost to foreign navies, the Navy incurred additional costs to remove some of the new equipment that was installed.

**Lack of Accurate
Information on Ship
Modernization Hampers
Program Management**

The Navy does not maintain accurate and complete records needed to plan modernization work and measure the results of the program, even though it has procedures and management information systems designed to capture these data. Because basic data were not available to evaluate the program, GAO developed and issued a questionnaire to gather more complete information. Responses to the questionnaire showed that 1,308 projects had been completed for the 75 ships selected for detailed review, but the Navy's management information system (as of February 1989) showed only 308 as completed. About 630 of the projects were not listed in the Navy's information system, and there was no record of any modernization work for several ships, although our questionnaire results indicated that 38 alterations had been installed on them.

GAO issued reports on the Fleet Modernization Program in 1976 and 1982. Both reports identified problems with deferrals of ship alterations and poor planning practices. The Navy made improvements in response to GAO's recommendations. However, during this review it was evident that the same problems existed. Had the management information system provided timely and complete information on these problems to Navy management officials, prompt corrective action might have been taken to resolve them.

Recommendations

To improve program oversight and add the needed program priority, the Secretary of the Navy should ensure that

- the program's management information system provides timely information to managers to support planning, programming, budgeting, executing, and evaluating the program and
- annual briefings on the results of the Fleet Modernization Program are provided to the Chief of Naval Operations' Executive Board, as required by a Navy instruction.

Agency Comments

The Department of Defense provided official written comments on a draft of this report and generally agreed with the report's findings and each of the recommendations. The Department said it had taken steps to address the problems identified in the report and to implement the recommendations.

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Abbreviations

CNO	Chief of Naval Operations
DOD	Department of Defense
FMP	Fleet Modernization Program
FMPMIS	Fleet Modernization Program Management Information System
GAO	General Accounting Office
O&M	operations and maintenance

Introduction

U.S. naval forces must be prepared to conduct prompt and sustained operations at sea to ensure national security. The Navy invests large sums in each of its combatant and support ships to carry out these operations. Each ship is called on to serve in its front line deterrent role for extended periods. It is common for the Navy's ships to remain in the active fleet for 30 to 40 years or more. However, the offensive, defensive, and operating systems installed on each ship are subject to wear and obsolescence and must be continually updated and/or replaced to maintain an advantage over the ever-improving and ever-increasing threat posed by adversaries. The Fleet Modernization Program (FMP) is the Navy's primary vehicle for maximizing fleet readiness by maintaining ship systems and war-fighting capabilities.

The FMP involves planning, programming, budgeting, and installing military and technical improvements in ships of the active and reserve fleets. The program's goals are to (1) improve ships' capabilities and material condition, (2) increase fleet readiness by improving standardization of ships, and (3) improve the safety, reliability, repairability, and habitability of ships and equipment.

From fiscal years 1986 to 1990, the Navy's ship modernization budget totaled about \$6.7 billion. Modernization work for fiscal year 1987 included funds to plan and design the installation of new systems and install the equipment. Procurement funds, estimated at \$960 million for the fiscal year 1987 FMP, plus operations and maintenance (O&M) funds, totaled about \$2.5 billion. Procurement funds were used to purchase modernization equipment for the ships.

Until fiscal year 1990, funds for ship modernization were allocated to the Navy in two budget categories: procurement for purchasing modernization equipment and O&M for the equipment's installation. Before that year, the Navy only identified the O&M funds needed to plan the installations and install the equipment as FMP costs; it did not include the procurement funds as part of the program. Procurement funds used to purchase FMP equipment were not identified separately from funds used to purchase equipment for other programs.

In fiscal year 1990, the Congress required that installation funds for all modernization items be transferred from the O&M to the procurement budget category. As a result, funds used to purchase equipment and funds used to design installation of the equipment and install it are now all part of the FMP. According to Navy program officials, a major impact of this change is that equipment may not be procured until the funds

needed to install it have also been approved. However, it may be difficult for the Navy to estimate the installation funds needed because modernization equipment is often purchased 2 to 3 years before it is installed and as much as 5 years or more in advance for large, complex systems.

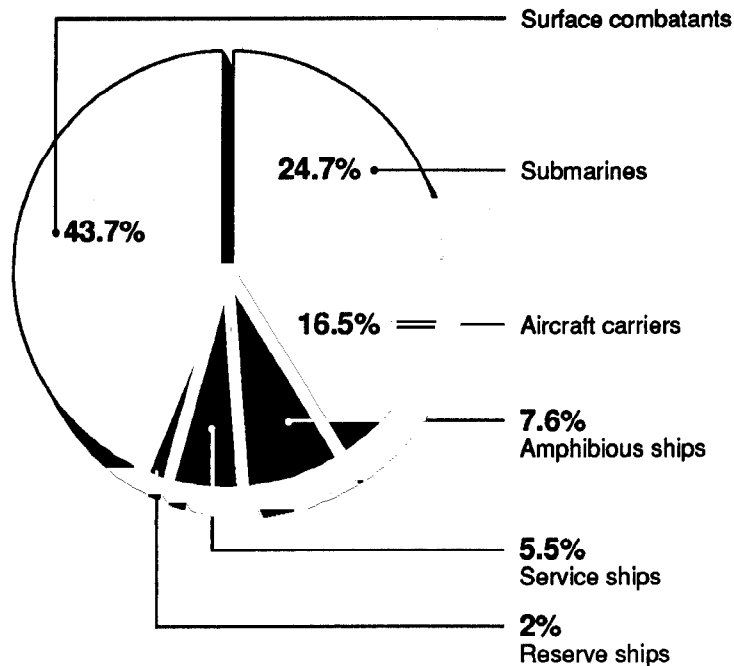
In fiscal year 1987, the program year we selected for examination, funds for ship maintenance and modernization¹ were appropriated as one line item of the Navy's O&M budget. (The fiscal year 1987 program was selected because it was the most recent year for which a sizable portion of the equipment had been installed.) The Navy allocated \$1.5 billion of a total O&M appropriation of \$24 billion to the fiscal year 1987 FMP. The majority of these funds were for the design and installation of centrally funded, more complex modernization projects called "Title K" ship alterations (K-alt). Other projects funded by the FMP included alterations to nuclear power plants, ordnance equipment, and hull, mechanical, and electrical equipment; updates of modernization plans for certain classes of ships; and maintenance of the management information systems for the FMP.

Size of Modernization Projects

The Navy's congressional budget request for the fiscal year 1987 FMP included funds needed to install 2,278 K-alt that totaled almost \$958 million. The K-alt ranged in size from installing steam piping drains at an estimated cost of \$3,457 for 10 days of work to installing special hull treatment on submarines (rubber tiles used to quiet submarines) at a cost of almost \$15 million for 32,500 days of work. Appendix II describes the 20 largest K-alt programmed for fiscal year 1987 by cost and work day estimates. Figure 1.1 shows a breakdown of K-alt by type of ship.

¹Maintenance refers to work that restores design capability but does not substantially improve the ship. Modernization improves the ship by adding new equipment or systems that increase the ship's mission capabilities or improve existing systems.

Figure 1.1: Breakdown of the K-Alt Installations in the Fiscal Year 1987 FMP Budget by Type of Ship



Process for Modernizing Ships

Planning and installing modernization projects is a lengthy, complex process involving many factors outside the direct control of the FMP managers. Installation design, from initiation to first installation of equipment, can take as long as 3 years. The entire process may involve actions that require 5 years or more. Navy FMP managers told us it takes from 3 to 5 years to develop and plan most ship modernization projects.

Prior GAO Reports

We issued reports on the FMP in 1982 and 1976.² Both reports identified problems with deferrals of ship alterations. In our 1982 report, we concluded that program deferrals could be reduced if better cost information were used in formulating the program's budget. We also noted that these deferrals could be lessened if the Navy adhered more closely to its own ship alteration guidelines, including enforcing its requirement that reports be filed showing when the work was completed and its cost

²The Fleet Modernization Program: Still Room for Improvement (GAO/PLRD-85-65, June 14, 1982) and Improvements Needed in the Navy's Fleet Modernization Program (GAO/LCD-76-406, Mar. 15, 1976).

(departure reports). We recommended that the Navy enforce its program directives more strictly. We also reviewed the process for ordering material and recommended that the procedures be strengthened to ensure that material was not ordered more than once or earlier than needed.

The Navy made improvements to the FMP in response to our recommendations, such as updating program guidance in the FMP manual and establishing alteration verification conferences to review the status of planned ship alterations. However, during this review we found that many of the same problems identified in the earlier reports still existed. Many ship alterations are still deferred, and departure reports are not filed, as required by a Navy instruction. We did not review the process for ordering material again.

Objectives, Scope, and Methodology

The Chairmen of the Subcommittees on Defense, House and Senate Committees on Appropriations, requested that we review ship modernization as part of the Committees' evaluation of the Navy's O&M budget. In response to the requests, we evaluated the Navy's fiscal year 1987 FMP to determine whether ships were modernized as justified in the budget submitted to the Congress and, when changes were made to the plan, the reasons for the changes and their impact on the program. Our review centered on the installation of ship alterations (K-alt), since they represent the majority of FMP funding and are the focus of the Navy's planning efforts. We selected the fiscal year 1987 program for review because it was the most recent year for which a substantial portion of the K-alt had been completed. The year in which modernization work is started determines which fiscal year's FMP funds are used.³ Several ships in the fiscal year 1987 FMP were not completed until 1988 and 1989. Work on a few ships with large maintenance projects, such as submarines undergoing major overhauls, were not completed until 1990.

During our review, we tried to obtain information from Navy records and data bases on the fiscal year 1987 K-alt but found the records to be inaccurate and incomplete. Therefore, to obtain accurate information, we developed a questionnaire that was sent to all Navy offices responsible for the installation of the K-alt in the fiscal year 1987 FMP. These

³For example, modernization work started on the last day of fiscal year 1987 is part of the 1987 FMP, even though most of the work is performed in the following fiscal year or years.

offices included Navy shipyards; repair facilities; Supervisor of Shipbuilding, Conversion, and Repair offices; and the Military Sealift Command. We sent 268 questionnaires to 27 Navy shipyards and activities and received 268 responses. We completed 29 additional questionnaires through discussions with program officials.

We selected 75 ships for additional review from the ships with K-alt that totaled \$1 million or more. For these ships, we obtained information on whether the departure reports and integrated logistics support certificates had been filed by the Navy activities responsible for the installation of the K-alt. We also compared the questionnaire responses for these ships to data in the FMP Management Information System. From these 75 ships, we selected 24 for detailed review to test the questionnaire responses and to obtain additional information about why some K-alt had not been installed as planned.

We did our work at Navy headquarters, Washington, D.C., and at naval shipyards at Long Beach, California; Pearl Harbor, Hawaii; Puget Sound, Washington; Norfolk, Virginia; and Charleston, South Carolina. We also performed work at the San Diego, California, and Newport News, Virginia, Supervisor of Shipbuilding, Conversion, and Repair offices. We performed our review between July 1989 and April 1990 in accordance with generally accepted government auditing standards.

Results of the Fleet Modernization Program

The Navy's total fiscal year 1987 budget request for the FMP was \$1.6 billion. This included about \$958 million for 2,278 modernization projects (K-alt) to be installed on 244 ships. About 29 percent, or 666, of these projects, representing about 20 percent, or about \$193 million, of the funds budgeted, were not installed as part of the fiscal year 1987 program. All work on 32 ships was canceled or moved to another year's program. In addition, 53 ships, with K-alt) totaling about \$125.6 million, were added to the program after the fiscal year 1987 budget was submitted. Navy guidelines discourage late additions to the FMP because of the extensive planning process necessary to prepare for successful installations.

Delays in completing K-alt) contributed to deployment delays for about 13 percent, or 32, of the ships included in the fiscal year 1987 program, representing about 48 percent, or \$413 million, of the modernization funds budgeted. Over one-half of the delays were for periods longer than 1 month, and three ships were delayed more than 5 months. Nine frigates were decommissioned in fiscal years 1988 and 1989 after the Navy spent \$9.9 million installing new equipment on them. Some of this equipment was subsequently removed, at further cost to the Navy, when most of the ships were later leased at no cost to foreign navies.

Many Changes Were Made to the Modernization Work Schedule

Deletions From the Fiscal Year 1987 Program

Modernization work scheduled on 32 of the 244 ships in the fiscal year 1987 budget was canceled or moved to another year's program. The K-alt) programmed for these ships totaled about \$73.5 million, or about 8 percent of the total funds requested for K-alt) in fiscal year 1987. Table 2.1 shows the types of ships eliminated from the fiscal year 1987 program and the dollar value of proposed alterations.

Table 2.1: Ships Deleted From the Fiscal Year 1987 FMP

	Number of ships	Total dollar value of K-alts
Aircraft carriers	1	\$5,004,920
Surface combatants	6	11,079,258
Submarines	13	51,680,131
Auxiliary and amphibious ships	12	5,774,310
Total	32	\$73,538,619

Responses to our questionnaire provided reasons why work was canceled or moved to another fiscal year's program. When the respondent knew the reason for the change, the most frequent reason noted was a change in the deployment schedule of the ship (13 of the 32 ships, or about 41 percent). In many cases, however, the respondents did not know the reasons for the changes (18 of the ships, or 56 percent). Reasons for changes to the ship schedule were not centrally maintained for the 1987 FMP, and Navy program officials told us that they could not determine from their records why the changes were made.

Additions to the Fiscal Year 1987 Program

Although many ships were deleted from the fiscal year 1987 program, many others were added after the Navy's budget was submitted to the Congress. Navy guidelines discourage late additions to the program because of the extensive planning process necessary to prepare for successful installation of K-alts. Nevertheless, 53 ships were added to the fiscal year 1987 FMP after the budget was submitted. The K-alts for these ships totaled \$125.6 million. Several ships initially included in the fiscal year 1988 FMP were moved forward to fiscal year 1987 to use unobligated O&M and modernization funds available from fiscal year 1987. The Congress deleted \$190.7 million from the Navy's fiscal year 1988 ship maintenance and modernization budget when we identified this situation.

Many Planned K-Alts Were Not Installed

Installation of about 29 percent, or 666, of the 2,278 K-alts included in the Navy's fiscal year 1987 budget, representing about 20 percent, or \$193 million, of the \$958 million budgeted for these K-alts, was not completed as part of the fiscal year 1987 FMP. About 11 percent, or 240, of the K-alts were not installed because all work on the ship was canceled or moved to another fiscal year. For ships that remained in the fiscal year 1987 program, about 17 percent, or 397, of the K-alts planned (11 percent, or \$102 million of the funds) were not installed. Table 2.2 shows the results of the fiscal year 1987 FMP.

Chapter 2
Results of the Fleet Modernization Program

Table 2.2: Installation Status of K-Alts in the Fiscal Year 1987 Budget

Dollars in thousands

Installation status	K-alts			
	Number	Percent	Amount	Percent
K-alts installed	1,612	71	\$764,628	80
All work canceled or moved to another year's FMP	240	11	73,946	8
K-alts not installed	397	17	102,032	11
K-alts partially installed	29	1	17,355	2
Total	2,278	100	\$957,961	100^a

^aColumn does not add due to rounding.

Although central records were not maintained on program changes, when the respondents knew why planned K-alts were not installed, they identified lack of material availability as the most common problem. Table 2.3 categorizes information obtained from our questionnaire on why some planned K-alts were not installed.

Table 2.3: Reasons K-Alts in the Fiscal Year 1987 FMP Were Not Installed

Dollars in thousands

Reason K-alt not installed	K-alts			
	Number	Percent	Amount	Percent
Material availability (only)	59	21	\$15,433	24
Funding (only)	28	10	10,981	17
Design (only)	25	9	6,509	10
Combination of reasons	6	2	3,462	5
Not enough time	5	2	2,175	3
K-alt already installed	19	7	1,340	2
Switched from K-alt to D-alt ^a	7	3	300	0
Other problems	15	5	2,958	5
Unknown	102	37	18,989	30
No response	7	3	1,627	3
Total	273	100^b	\$63,774	100^b

^aK-alts are funded centrally by Naval Sea Systems Command as part of the FMP. D-alts are less complex and are funded by maintenance funds controlled by the Commanders of the Atlantic and Pacific Fleet Commands.

^bColumn does not add due to rounding.

During our detailed review of 24 ships, we obtained additional information on the reasons why K-alts were not installed as planned. Reasons categorized as problems with material availability included instances in which material was not received in time to be installed or the material received was defective. Design problems included instances in which

installation drawings had not been completed in time to support modernization work. Instances in which planned K-alts were found to have already been installed were discovered during ship checks in which Navy officials visited the ships to verify the installation drawings. Some K-alts were changed to D-alts because the Commanders of Atlantic and Pacific Fleet Commands decided to fund needed K-alts that had been deleted from the FMP due to a lack of funds.

Poor Planning Contributed to Installation Problems

Faulty planning prevented the Navy from meeting some installation schedules. For example, our questionnaire data showed that of the 273 K-alts for which information was obtained, 7 percent, or 19, were not installed because the Navy had discovered late in the planning process that the scheduled K-alt had already been installed. Of 24 ships we examined in detail, 8 had K-alts canceled because the K-alts had already been installed on the ships. A submarine, the USS Seahorse, had three scheduled K-alts canceled because they had already been installed. The design and installation of these three K-alts totaled \$97,231. Appendix III contains additional information on 24 ships we reviewed in detail.

According to Navy officials, poor planning increased the cost of many of the K-alts that were installed. We could not determine from Navy records the magnitude of cost increases. However, several shipyard officials told us that costs associated with planning deficiencies, including delays and correcting design deficiencies, were significant. For example, one of the ships reviewed in detail, the USS Yarnell, received a series of K-alts. Of 30 K-alts scheduled for the USS Yarnell, 28 were installed, but the total cost of the K-alts was over \$32 million (95,510 work days) compared to the original Naval Sea Systems Command's estimate of \$15.5 million (38,800 work days). The initial shipyard estimate was \$23.7 million (59,345 work days). Shipyard officials cited many problems with the design of the K-alts that caused these increases, including receipt of the installation drawings late in the planning process.

Deployment Dates Were Delayed by K-Alts

The deployment of 32 ships was delayed because of problems with the installation of K-alts; 3 of the ships were delayed by more than 5 months. These 32 ships represent 13 percent of the 244 ships in the fiscal year 1987 FMP budget. The K-alts budgeted for these ships totaled about \$413 million, or 43 percent, of the \$958 million budgeted for the ships.

Most of the delays involved problems with the design of the K-alt. Other difficulties included material availability problems and underestimating the days needed to accomplish the work. Appendix IV describes the results of our questionnaire requesting information on ship alteration delays.

Several Ships Were Decommissioned After Modernization Work Was Completed

Nine frigates were decommissioned in fiscal years 1988 and 1989 after the Navy had spent about \$9.9 million installing new equipment on the ships as part of the fiscal year 1987 FMP. Almost \$3.1 million in FMP funds were used to install 15 K-alt. on the USS Davidson. The work included increasing the ship's communication capabilities, adding secure voice communications, installing new radio sets, and replacing part of the torpedo countermeasures system for improved torpedo decoy ability. Appendix V lists the ships that were decommissioned after being modernized as part of the fiscal year 1987 FMP.

Navy FMP officials told us that the decision to decommission these ships was made late in the modernization planning process, after the contracts had been awarded. These officials said it would have cost as much in nonrecoverable costs to stop work on the contracts as it had to install the equipment. However, most of these ships were later leased at no cost to foreign navies, and some of the equipment added, such as the torpedo countermeasures system, had to be removed before the ships were delivered. We were not able to determine the cost to remove the equipment.

Program Results Are Not Accurately Measured or Reported

The Navy does not routinely measure the results of the FMP or provide annual briefings to the Chief of Naval Operations' (CNO) Executive Board on the results of the program, as required by its own instruction. The Navy also does not maintain accurate data on the installation status of planned modernization projects, although it has procedures and management information systems designed to capture this information.

To obtain data to evaluate the effectiveness of the program, we developed and issued a questionnaire for the Navy offices that were to install the K-alt. The questionnaire responses indicated that 1,308 K-alt had been installed on the 75 ships selected for detailed review. Navy records showed, however, that only 308 were completed; more than 600 of the completed K-alt were not listed in the records.

Sources of Information on the Installation Status of K-Alts

There are three central sources of information on K-alt: the FMP Management Information System (FMPMIS), the CNO escrow accounts, and departure reports from installing activities.

FMPMIS Data Base

FMPMIS⁴ is the Navy's official automated data base for FMP management, intended to provide timely information to support planning, programming, budgeting, and executing the program. FMPMIS reports the installation status of each K-alt and is supposed to list each ship, all K-alt applicable to the ship, and whether the K-alt have been completed. To test the accuracy and completeness of FMPMIS, we compared FMPMIS data for the fiscal year 1987 FMP as of February 22, 1989, with the information obtained on our questionnaire. The questionnaire responses indicated that 1,308 K-alt had been installed on the 75 ships selected for detailed review, but FMPMIS reports showed that only 308 had been completed. Over 600 projects were not listed, and there was no record of any modernization work for several ships, although 38 K-alt had been installed on them, according to the questionnaire responses. Commenting on the accuracy of FMPMIS, Navy officials told us during our review and at the conclusion of our work that FMPMIS records on the 1987 program as well as subsequent programs were not complete or accurate.

⁴Navy instruction OPNAVINST 4720.2E establishes FMPMIS as the "authoritative source of information used by FMP managers and activities." The instruction requires that FMP management functions be supported by a FMPMIS "containing all the planning and status information required for timely and accurate decision making."

Departure Reports

Each Navy activity that installs K-alts is required to file a departure report within 60 days after modernization work has been completed on each ship. These reports provide the only verification that K-alts have been installed. However, many of the reports for the fiscal year 1987 FMP were never filed. For 56 of the 75 ships we examined in detail for which departure reports were required, 27 reports had not been prepared. (Work on 20 ships had not been completed or 60 days had not elapsed since completion.) At one Supervisor of Shipbuilding, Conversion, and Repair office we visited, officials said they had not prepared departure reports for years because of personnel shortages.

Escrow Accounts

The Naval Sea Systems Command's FMP Management Office uses the escrow account to track the changes to modernization work authorized for each ship. Funds for all K-alts added to or deleted from the program, are supposed to be recorded in these accounts. To test the accuracy of the escrow account, we compared information provided in the account with the questionnaire responses. We found many instances in which K-alts had been canceled but still had funds authorized in the escrow account. The escrow account information for 13 of the 24 case study ships was not accurate. For example, the USS Seahorse had six K-alts canceled, but the account continued to reflect funds for their installation, including \$959,907 for one K-alt.

Duplicate Information on K-Alt Status Is Collected and Maintained

For aircraft carriers, the Navy maintains a separate data base from FMPMIS showing the status of all ship alterations, including K-alts. This data base, the Shipalt Data Bank, is maintained by a Naval Sea Systems Command Detachment called the Planning and Engineering for Repairs and Alterations, Aircraft Carriers. The information in the data base had not been used to update FMPMIS. The information on the status of K-alts planned for aircraft carriers in FMPMIS for the fiscal year 1987 FMP did not correspond to the responses to our questionnaire.

The Commander, Naval Submarine Forces, Pacific, also maintains a data base on ship modernization projects for its submarines, called the Type Commander Alteration Management System, in which information on the status of K-alts is recorded. The information in this separate system had not been used to update the information in FMPMIS. Information in FMPMIS on fiscal year 1987 FMP K-alts for Pacific Fleet submarines was not accurate.

CNO Briefings Were Not Held

Navy instruction OPNAVINST 4720.2E requires the CNO's Executive Board to be briefed annually on the results of the program. However, the Naval Sea Systems Command had not briefed the Board since the fiscal year 1986 program. The Naval Sea Systems Command's Program Manager told us that he had not prepared these annual briefings as required because the Executive Board had not requested them.

Conclusions

The Navy does not routinely measure the results of the FMP or provide annual briefings to the CNO on the accomplishments of the program. It also does not maintain accurate records on the installation status of planned K-alt's. Consequently, its management information system does not provide timely information to managers to support planning, programming, budgeting, and executing the program. In addition, duplicate systems are maintained by some Navy units, but information from these systems is not provided to the official Navy data base for the FMP.

Our previous reports on the FMP in 1976 and 1982 identified problems with deferrals of ship alterations and deficiencies in program planning. The Navy made improvements in response to our recommendations. However, during this review it was evident that the same problems existed. Had the management information system provided timely and complete information on these problems to Navy management officials, prompt corrective action might have been taken to resolve them.

Recommendations

To improve program oversight and add the needed program priority, the Secretary of the Navy should ensure that

- the program's management information system provides timely information to managers to support planning, programming, budgeting, executing, and evaluating the program and
- annual briefings on the results of the Fleet Modernization Program are provided to the Chief of Naval Operations' Executive Board, as required by Navy instruction.

Agency Comments and Our Evaluation

The Department of Defense (DOD) provided official written comments on a draft of this report (see app. I) and generally agreed with the report's findings and recommendations. DOD said it had taken steps to address the problems identified in the report and to implement the recommendations.

DOD did not agree with our finding that no central records were maintained on reasons for changes to ship maintenance and modernization schedules. DOD said the Deputy Chief of Naval Operations (Logistics) maintains records of reasons for schedule changes for a 2-year period. However, Navy officials told us that the records referred to in our report were not maintained until the Ship Maintenance and Modernization Division was reestablished in 1989 and thus were not available for the 1987 program. We cannot comment on the completeness or accuracy of these records for other years' programs.

We found that many K-altS scheduled for installation on ships as part of the fiscal year 1987 program were deleted. We could not determine from the FPMIS data base whether these K-altS were installed as part of other years' programs. DOD agreed that the records were inaccurate and incomplete but stated that a review of these records showed that many of the deleted K-altS were later installed. At the time of our review, Navy program managers could not determine whether the deleted fiscal year 1987 K-altS were subsequently installed.

We reported that the three data bases maintained to track the installation status of modernization projects were often incomplete and inaccurate. DOD agreed with this finding and said steps were being taken to improve these reporting systems. Although it did not disagree with our conclusions, DOD disagreed with one example in the report. We found that the USS Seahorse had six installations canceled, but the Navy's escrow account continued to reflect funds available for these installations, including \$959,907 for one project. DOD said an escrow change order issued on October 21, 1986, deleted funds for this installation. The information provided by the Navy at the time of our review did not include the escrow change mentioned by the Navy. We believe this further supports our conclusions concerning the incompleteness and inaccuracy of these records.

Comments From the Department of Defense



ASSISTANT SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301-8000

PRODUCTION AND
LOGISTICS

January 10, 1991

(L/MD)

Mr. Frank C. Conahan
Assistant Comptroller General
National Security and
International Affairs Division
U.S. General Accounting Office
Washington, DC 20548

Dear Mr. Conahan:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report, "SHIP MAINTENANCE: The Navy's Fleet Modernization Program," dated November 19, 1990 (GAO Code 394328), OSD Case 8543.

With one exception, the Department generally agrees with the report findings, and agrees with each of the recommendations. The Department has taken steps to address the identified problems and implement the agreed-to corrective actions.

The Department appreciates the opportunity to review the GAO draft report in writing. The detailed DoD comments on each finding and recommendation are provided in the enclosure.

Sincerely,

A handwritten signature in cursive script that reads "David J. Berteau".

David J. Berteau
Principal Deputy

Enclosure

GAO DRAFT REPORT - DATED NOVEMBER 19, 1990
(GAO CODE 394328) OSD CASE 8543

"SHIP MAINTENANCE: THE NAVY'S FLEET MODERNIZATION PROGRAM"

DEPARTMENT OF DEFENSE COMMENTS

* * * * *

FINDINGS

- **FINDING A: Fleet Modernization Program Funding.** The GAO reported that the Fleet Modernization Program is the Navy's primary vehicle for maximizing fleet readiness by modernizing war fighting capabilities. The GAO noted that, until FY 1990, funds for the program were allocated to the Navy in two budget categories (1) procurement funds for purchasing modernization equipment and (2) operations and maintenance funds for its installation. The GAO reported that, as a result of the Secretary of Defense transferring installation funds for all modernization items from the Operations and Maintenance to the Procurement accounts in FY 1990, all funds used to design installation of the equipment and install it are now a part of the Fleet Modernization Program. The GAO found that a major impact of this change is that equipment may not be procured until the funds needed to install it have been programmed. The GAO concluded, however, that it may be difficult for the Navy to estimate the installation funds needed, because modernization equipment is often purchased 2 to 3 years before it is installed and as much as 5 years or more in advance for large, complex systems. (pp. 12-16/GAO Draft Report)

DoD Response. Concur.

- **FINDING B: Deletions From the FY 1987 Program.** The GAO reported that modernization work scheduled on 32 of the 244 ships in the FY 1987 budget was cancelled. The GAO further reported that the complex ship modernization projects programmed for the these

Enclosure

Now on pp. 8-11.

Now on pp. 13-14.

ships totaled about \$73.5 million--or 8 percent of the total funds requested in FY 1987 for the complex ship modernization projects. The GAO found that the most frequent reason why work was cancelled or moved to another fiscal year program was a change in the deployment schedule of the ship (which occurred in 13 of 32 cases). The GAO noted, however, that, in many cases (10 of 32), Navy respondents to a GAO questionnaire did not know the reasons for the schedule changes. The GAO concluded that, because the reasons for changes to ship schedules are not centrally maintained, Navy Fleet Modernization Program officials not able to determine from the records why changes were made. (pp. 20-21/GAO Draft Report)

DoD Response. Partially concur. The Department does not agree with the GAO conclusion that the reasons for changes to ship schedules are not centrally maintained. The Ship's Maintenance and Modernization Division of the Office of the Deputy Chief of Naval Operations (Logistics) maintains records of the reasons for schedule changes for a period of two years. The records usually consist of hard copy messages received from the Fleet Commanders in Chief. Information from these records was used to provide a quarterly report to Congress in Fiscal Year 1990, as directed in the Fiscal Year 1990 DoD Appropriations Act.

- **FINDING C: Many Ships Were Added to the FY 1987 Program.** The GAO reported many ships were added to the FY 1987 program, despite Navy guidelines that discourage late additions to the program because of the extensive planning process necessary to prepare for successful installation of the complex ship modernizations. The GAO found that 53 ships with modernization costs of \$141.2 million were added after the budget was submitted and 38 after the beginning of the fiscal year. The GAO also found that several ships initially included in the FY 1988 Fleet Modernization Program were moved forward to FY 1987 to use unobligated funds from FY 1987. The GAO noted that, when the Subcommittees on Defense, Senate and House Appropriations Committees, learned of that practice from the GAO, they deleted \$190.7 million from the Navy FY 1988 ship maintenance and modernization budget. (p. 22/GAO Draft Report)

Now on p. 14.

DoD Response. Concur. Modernizations are accomplished during the ship's programmed maintenance repair cycle. Schedule changes for ship maintenance are driven by operational commitments. As the repair cycle for ship maintenance and modernization are

changed as a result of changes in operational schedules, other ships are reviewed for possible acceleration.

- **FINDING D: Many Complex Ship Modernizations Were Not Installed.** The GAO reported that the Navy did not install about 29 percent or 666 of 2,278 complex ship modernization projects included in the Navy 1987 budget--representing \$193 million in budgeted funds. The GAO found that 240 projects, or 11 percent, were not installed because all work on the ship was cancelled or moved to another fiscal year. The GAO further found that for ships that remained in the FY 1987 program, about 397, or 17 percent of the modernization projects, were not installed. The GAO reported that, in responding to the GAO questionnaire, Navy officials identified the lack of material availability as the most common reason for a project not being installed, followed by (1) lack of funding and (2) design problems (installation drawings not completed in time to support modernization work). The GAO also found instances where the planned alteration projects had already been installed. In addition, the GAO noted that the Commanders of the Atlantic and Pacific Fleets have changed some complex alterations to less complex projects (D alts), funded out of maintenance funds under their control--because the original projects had been deleted from the Fleet Modernization Program due to lack of funds. (pp. 23-26/GAO Draft Report)

DoD Response. Partially concur. Planned modernizations are deleted or rescheduled for a variety of reasons. Changes in the operational schedules cause availabilities to slip from one fiscal year to the next. Often, emergent high priority alterations are added, which require offsets from lower priority alterations. In many cases, alterations planned to be installed in Fiscal Year 1987 were installed in subsequent years, based on schedule availability.

A review of the records contained in the Fleet Modernization Management Information System reveal that many of the alterations deleted from the Fiscal Year 1987 program were subsequently installed. One of the ships cited in the report, SSN 669, had numerous alterations deleted, which were not reprogrammed due to her inactivation.

The Fleet Modernization Program process, as delineated in the Fleet Modernization Program Manual, is a well structured process that requires six years for planning, programming, and budgeting

for the installation of Ship Alterations. In order for the process to run successfully, discipline is required by all participants to adhere to the established planning process. Deviations from the plan create inefficiencies and the potential for a delay in installation, which the GAO identified as a lack of material availability and design problems.

- **Finding E: Poor Planning Contributed to Installation Problems.**

The GAO found that faulty planning prevented the Navy from meeting some installation schedules. The GAO reported, for example, that 19 of 273 alterations were not installed because the Navy discovered, late in the planning process, the alterations already had been installed. The GAO observed that the submarine, USS SEAHORSE, for instance, had three scheduled complex modernization projects cancelled because they had been installed already. The GAO also reported that shipyard officials indicated that poor planning increased the cost of many of the modernization projects significantly due to (1) delays, (2) correcting design deficiencies, and (3) efforts to obtain material in a timely fashion. The GAO found, for example, that the total cost of 28 complex modernization projects on USS YARNELL was \$28 million as compared with the original Naval Sea Systems Command estimate of \$15.5 million and the initial shipyard estimate of \$23.7 million--due to design problems, including receipt of the installation drawings late. (pp. 26-27/GAO Draft Report)

- **DoD Response.** Concur.

In an effort to improve ship alteration planning, a Chief of Naval Operations Quarterly Alteration Verification Conference is held twelve to fifteen months prior to the ship modernization availability start date. The purpose of this conference is to determine the executability of each alterations and evaluate associated risk. Executability is determined by reviewing the Design, Integrated Logistics Support, and material status for each alteration. In most cases, high risk ship alterations are deferred. There are occasions where the Chief of Naval Operations Warfare Sponsor considers the alteration of high enough priority to warrant execution of a high risk alteration. The risk is managed to minimize the impact while accomplishing the alteration.

In the case of USS YARNELL, for example, the prime driver for the overhaul was the New Threat Upgrade ship alterations package. The New Threat Upgrade is a complex modernization effort. Early in the New Threat Upgrade program, three Guided Missile Cruisers (CGs) were concurrently scheduled to have alterations installed along with USS YARNELL. As a result, the New Threat Upgrade design was subject to many lessons learned from these ships. These design changes were passed to follow-on ships through the Fleet Modernization Program Liaison Alterations Records process. Because of this, the original \$19.5 million estimate grew proportionately. However, the objective to install a high quality and effective new state-of-the-art combat system, was met.

- **FINDING F: Deployment Dates Were Delayed by the Complex Modernization Projects.** The GAO reported that the redeployment of 32 ships (which represented 15 percent of the 1987 program) was delayed, including four ships delayed more than 5 months--because of the installation of the complex modernization projects. The GAO also noted that more than half of the projects were delayed at least one month. The GAO found that most of the delays were due to design problems, but other reasons included (1) material availability, (2) conflicts with other work on the ship, and (3) underestimation of the days needed to accomplish the work. (p. 27/GAO Draft Report)

DoD Response. Concur.

As previously cited in the DoD response to Finding E, late design changes sometimes result from the acceptance of risk on the part of the Navy to install a high risk-priority weapon system on a ship. A good example is the back fit of the TOMAHAWK missile system on the DD 963 Destroyer class. In that case, the Navy accepted the risk of an immature design against the requirement to field the weapon system.

In some cases, installation delays are attributed to design problems and the Navy has taken action to monitor and evaluate planning yard performance in developing alteration design packages. These resulted in the development of the following ship alteration process evaluation reports:

- Planning Supervisor of Shipbuilding Conversion and Repair Report.

- Naval Supervising Activity Report.
- Ship Program Managers Report.
- Planning Yard Report.

These reports provide a measure of the performance of the planning yard in the areas of design quality, responsiveness, and support. All reports have been implemented as of June 1990 and the Ship Alterations Process Evaluation Reporting System is in effect for the 4th Quarter execution after which, a quarterly Executive Planning Yard Summary Report will be issued. The Executive Planning Yard Summary will address design cost, timeliness, quality and support by each of the planning yards. The use of the aforementioned reports will aid in resolving similar deficiencies addressed in Findings D and E.

- **FINDING G: Several Ships Were Decommissioned After Modernization Work Was Completed.** The GAO reported that nine frigates were decommissioned in FY 1988 and FY 1989, after the Navy had spent \$9.9 million installing new equipment on the ships as part of the FY 1987 Fleet Modernization Program. The GAO found, for example, that almost \$3.1 million in Fleet Modernization Program funding was spent on USS DAVIDSON prior to decommissioning. The GAO reported that, according to Navy officials, the decision to decommission the ships was made late in the modernization planning process, after contracts had been awarded. The GAO further reported that, again according to Navy officials, it would have cost as much in nonrecoverable costs to stop work as it had to install the equipment. The GAO further found, however, that, when the ships were later leased to foreign navies, at no cost, the Navy incurred additional costs to remove some of the new equipment that had been installed. (p. 28/GAO Draft Report)

DoD Response. Concur. The ships in question were decommissioned for budgetary reasons in advance of the originally planned decommissioning dates. Because of the long period required in the modernization process, the decommissionings were not known prior to the start of modernization. The decommissioned ships were leased to the governments of Pakistan and Brazil. The terms of the Arms Export Control Act required the leases be on a no cost basis. Under the terms of the leases; however, the ships are to be returned at any time upon the request of the United

States, and are considered by the Department to be mobilization assets.

- **FINDING H: Sources of Information on the Installation Status on the Complex Modernization Projects.** The GAO reported that there are three central sources of information on the modernization projects (1) the Fleet Modernization Program Management Information System, (2) the Chief of Naval Operations escrow accounts, and (3) departure reports from installing activities. The GAO concluded that timely information is not provided to managers to support planning, programming, budgeting, and execution of the Fleet Modernization Program. The GAO also noted that previous GAO reports (OSD Cases 4171 and 5886) 1/ 2/ have identified problems with deferrals of ship alterations and deficiencies in program planning, yet the same problems still exist. (pp. 16-17, pp. 29-34/GAO Draft Report)

- **DoD Response.** Concur. The Department wishes to point out, however, with frequent updates to the Fleet Modernization Program Management Information System central data base there will be a reduction in late information and inaccuracies.

- **The Fleet Modernization Program Management Information System**--The GAO found, through questionnaire responses, that 1,612 projects had been installed--when the Management Information System showed only 357 completed. The GAO also found that 511 (or 32 percent) of the completed complex modernization projects were not listed, and there was no record of any modernization work for several ships--although work had been done. The GAO reported that Navy officials agreed that the Fleet Modernization Program Management Information System data was not complete or accurate.

DoD Response. Concur. Naval Sea Systems Command, as the manager of the Fleet Modernization Program Management Information System, conducts over twenty-five quality assurance reviews of Fleet Modernization Program Management Information System data. The Naval Sea Systems Command recognized the inaccuracy of the Ship Alteration Completion file and, since 1989, has taken corrective measures, which have resulted in significant improvements. According to Fleet Modernization Program Management Information System data, in 1989, 910 Ship Alterations out of a total of 3,169 (or 28 percent of the alterations for Fiscal Years

1987-1989) remained in a "not complete" status in the Fleet Modernization Program Management Information System. Subsequent Fleet Modernization Program Management Information System quality reports show an improving trend. As of November 16, 1990, 195 Ship Alterations out 4,160 (or less than 5 percent of ship alterations for Fiscal Years 1987-1990) remain in the "not complete" status. The Naval Sea Systems Command will continue to monitor, validate, and correct the quality of the Fleet Modernization Program Management Information System data to provide timely and accurate information to managers in support of planning programming, budget, and execution of the Fleet Modernization Program.

- **Departure Records.** The GAO reported that departure records provide the only verification that the complex modernization projects have been installed. The GAO observed, however, that many of the reports for the FY 1987 Fleet Modernization Program were never filed. The GAO sample found 8 out of 22 cases where required reports were not prepared. The GAO reported Navy officials claimed that they did not have the staff to compile all the detailed cost information and, as a result, had not prepared departure reports for years. The GAO noted that it had recommended in a previous report (OSD Case 4171) 1/ that the Navy should enforce its directives more strictly and ensure that departure reports are completed.

DoD Response. Concur. In December 1989, representatives from the various Naval Sea Systems Command directorates, responsible for fleet modernization, met with members of the Industrial and Facility Management Directorate to discuss the issue of non-receipt of departure records, in accordance with Naval Sea Systems Command Instruction 4790.14A, Change 2. It was the Naval Sea Systems Command position that the reports are essential for Ship Program Managers to update the Fleet Modernization Program Management Information System--not only reflect Ship Alteration completion status but also to reflect actual return costs of ship modernization. A documented survey of all Naval Sea Systems Command Program Managers indicated overwhelming support to ensure timely and accurate submission of the departure report by the field activities (i.e., Shipyards, Supervisor of Shipbuilding Conversion and Repair). As a result of the

meeting, in June 1990, the Naval Sea Systems Command issued a directive to the field activities reiterating the requirement to submit departure reports in accordance with established guidelines. The Naval Sea Systems Command will continue to monitor timely submission of departure records via the quarterly Title "K" Ship Alteration Completion Status audit.

- **Escrow Accounts**--The GAO reported that funds for all complex modernization projects are supposed to be recorded in the Chief of Naval Operations escrow accounts. The GAO found instances, however, where (1) installations had been made, but funds had not been allocated, and (2) installations had been cancelled but the escrow accounts still showed authorized funds. The GAO found that 18 of 24 ships it reviewed in detail were not accurate. The GAO reported that USS SEAHORSE, for example, had six installations cancelled, but the accounts continued to reflect funds for the installations, including \$959,907 for one project.

DoD Response. Partially concur. In Fiscal Year 1987, there are instances when the escrow account records are incomplete. The Navy has taken actions to make improvements in the escrow file process. These files now provide a credible record of authorized changes to the program. The Department does not concur with the GAO report concerning USS SEAHORSE. Escrow change number 02-02-87 issued by Naval Sea Systems Command on October 21, 1986 deletes Ship Alteration 983 valued at \$959,907 from the authorized program for USS SEAHORSE. That same escrow change also deleted six other ship alterations previously authorized for USS SEAHORSE.

- **Other Data Bases**--The GAO reported that the Navy maintains a separate database for aircraft carriers, the Shipalt Data Bank, which shows the status of all ship alterations--including the complex ship modernization projects. The GAO found that the data in that system was, for the most part, accurate. The GAO also found, however, that the data had not been used to update the Fleet Modernization Program Management Information System, the official database for the program. The GAO reported that the Commander, Naval Submarine Forces, Pacific, also maintains a database on ship modernization projects for its submarines. Again, the GAO found that, while the information in that system was complete and accurate, it had not been used to

update the Fleet Modernization Program Management Information System. The GAO also found that the Chief of Naval Operations had not briefed the Chief of Naval Operations Executive Board since the FY 1986 program, as required by Navy regulations.

DoD Response. Concur. Naval Sea Systems Command recognizes that there are other data bases used by various codes/commands tailored to a specific need or local requirement. In the case of aircraft carriers, their Ship Alterations Data Bank computer system is, in fact, maintained by the same organization that maintains the Fleet Modernization Program Management Information System. That data, while possibly more timely, is in no way official and does not authorize any material procurement or obligation of funds. However, the information in that data bank is used to update the Fleet Modernization Program Management Information System. This system is a management tool designed to provide information on the fourteen aircraft carriers which is unique to carriers and not part of the Fleet Modernization Program Management Information System data base. The Type Commanders Automated Management System, used by the Commanders, Submarine Forces, in both the Atlantic and Pacific Fleets, resides on one of the fifty-four Fleet Modernization Program Management Information System filed nodes and is a subsystem of the Fleet Modernization Program Management Information System.

* * * * *

RECOMMENDATIONS

- **RECOMMENDATION 1:** The GAO recommended that, to improve program oversight and add the needed program priority, the Secretary of the Navy should ensure that the Fleet Modernization Program management information system provides timely information to managers to support (1) planning, (2) programming, (3) budgeting, and (4) execution of the program. (p. 35/GAO Draft Report)

DoD Response. Concur. The Navy is in the latter stages of implementing the Ship Alteration Budget Reporting and Evaluation System that will be utilized to augment and update the Fleet Modernization Program Management Information System. The Ship

Alteration Budget Reporting and Evaluation System will be operational in June 1991 and will provide for electronic data transfer, establish a material/installation link, and provide identification of the full costs of a ship alteration. The resource sponsors will have the ability to analyze and update data for programming purposes and then upload the Fleet Modernization Program Management Information System electronically when decisions are made. This system should provide timely information to support the planning, programming, and budgeting portions of the Fleet Modernization Program.

The accuracy and timeliness of data input into the Fleet Modernization Program Management Information System has been a matter of continuous concern for the Naval Sea Systems Command. The maintenance of fifty-four field sites, coupled with the complexity of the overhaul process, makes the collection and distribution of data a significant task. The Naval Sea Systems Command now conducts over twenty-five various quality assurance reviews of the data in the Fleet Modernization Program Management Information System. Results to date show significant improvement since Fiscal Year 1987. The Naval Sea Systems Command will continue to improve and provide the necessary assistance as required.

- **RECOMMENDATION 2:** The GAO recommended that, to improve program oversight and add the needed program priority, the Secretary of the Navy should ensure that annual briefings on the results of the Fleet Modernization Program are provided to the Executive Board of the Chief of Naval Operations, as required by the Navy instruction. (p. 35/GAO Draft Report)

DoD Response. Concur. The recommendation is moot, however, since it already has been implemented. The Ship Depot Maintenance Flag Steering Board recommended that, during the first or developmental year of the biennial budget process, the Fleet Modernization Program Chief of Naval Operations Executive Board be combined with an assessment of other depot maintenance issues into one brief and presented to the Chief of Naval Operations during the fall. In the second or apportionment year of the budget process, a single Fleet Modernization Program Chief of Naval Operations Executive Board would be presented during the summer. The first combined Chief of Naval Operations Executive Board was held in September 1990.

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- 1/ "Improvements Needed in the Navy's Fleet Modernization Program," LCD-76-406, dated March 15, 1976 (OSD Case 4171).
 - 2/ "The Fleet Modernization Program: Still Room for Improvement," PLRD-85-65, Dated June 14, 1989 (OSD Case 5886).

Twenty Largest K-Alts in the Fiscal Year 1987 FMP

The Navy's congressional budget request for the fiscal year 1987 FMP included the installation of 2,278 K-alts that totaled about \$958 million. Table II.1 shows the 20 largest K-alts programmed for fiscal year 1987 by work day and cost estimates.

Table II.1: Twenty Largest K-Alts in the Fiscal Year 1987 FMP

Dollars in millions			
Alteration type number	Description	Work day estimate	Estimated cost
SSN 3019 SSN 2064	Special hull treatment: Affixes rubber tiles to the exterior of the hull to reduce noise generated by submarines. ^a	32,500	\$7.7 to \$14.8
CV 6216	NTDS/ASWM upgrade: Improves the Navy Tactical Data System to allow more accurate and efficient processing of information relative to air, surface, and subsurface threats.	31,172	\$11.6
FFG 0006 DD 0019	LAMPS MK III: Adds the Light Airborne Multipurpose System MK III, which provides the capability to detect, localize, classify, and pursue submarines at extended ranges. ^b	30,250	\$8.3 to \$10.9
CV 5436	Replace steam accumulators with wet receivers: Provides superior capability to launch aircraft with heavier ordnance loads while decreasing ship propulsion fuel requirements, maintenance requirements, and launch wind velocity.	22,459	\$8.4
SSN 2110 SSN 2790	AN/BQQ-5C(V) sonar system: Provides upgraded sonar capabilities to submarines. ^c	20,000	\$6.7 to \$9.1
DD 0282	Tomahawk Vertical Launch System: Provides conventional engagement of surface ships and conventional and nuclear engagement of land targets at extended ranges.	20,000	\$9.5
CV 6644	CIWS maintenance enclosure: Adds a sheltered structure to the sponsons containing the close-in weapon system mounts. The enclosure provides protected access and equipment storage for routine and unscheduled maintenance and inspection requirements for a gun mount.	16,600	\$6.2
DDG 0032	NTU-AN/SPS-49(V)5 with anti-torpedo defense: Provides a highly accurate, long-range air search radar. The system is compatible with the new standard missile.	15,000	\$5.8
DDG 0030	MK 74 MFCS SM-2 upgrade: Upgrades the combat system to incorporate the capabilities of the Standard Missile Block II Missile Fire Control System.	14,250	\$5.6

(continued)

**Appendix II
Twenty Largest K-Alts in the Fiscal Year
1987 FMP**

Dollars in millions

Alteration type number	Description	Work day estimate	Estimated cost
CV 5703	CHT modifications: Increases the reliability and effectiveness of the collection, holding, and transfer system. The system is the primary sewage and water treatment system. It meets national and international requirements for environmental protection.	12,827	\$4.8
CV 6314	Convert elevators to hydraulic operation: Modernizes existing ballistic doors and hatches associated with weapons elevators. Converts operation from maintenance intensive pneumatic systems to hydraulic operation.	11,379	\$4.2
CG 1431	Combat direction system upgrade: Integrates target information and passes it along a data link to other ships in the battle force. The system provides expanded data processing capability.	11,200	\$3.9 to \$4.8
CV 6099	MK 2 FDNGLS: Adds the Flush Deck Nose Gear Launch System to provide a safer, more reliable, and more cost-effective method of attaching an airplane to a catapult for launching.	10,660	\$4.0
SSN 1956	Sea Nymph: Adds the AN/WLQ-4 system, which provides automated electronic surveillance capabilities to submarines.	10,500	\$3.5 to \$4.2
FFG 0004	RAST: Adds the Recovery, Assist, Securing, and Traversing system to provide complete support to the LAMPS III helicopter and adds longitudinal hull strength to the ship.	10,170	\$3.5
CV 5065	MK 7 jet blast deflector: Allows more rapid launching operations by providing greater protection of equipment and personnel behind airplanes being launched.	9,729	\$3.6
LHA 0060	Aviation parts stowage platform: Upgrades the Aviation Intermediate Maintenance Depot and installs new facilities to support a composite squadron of helicopters and AV-8 aircraft.	9,000	\$3.8
CV 4470	Improve officer and CPO pantries-gallery: Improves space use and sanitation capabilities in food preparation areas.	8,286	\$3.1
DDG 0109	NTU power upgrade: Upgrades the ship's electrical generating system by replacing existing 2,000 kilowatt generators with 2,500 kilowatt generators. Includes upgrades to the electrical distribution and related systems as part of the New Threat Upgrade package of K-alts.	8,000	\$3.1

(continued)

**Appendix II
Twenty Largest K-Alts in the Fiscal Year
1987 FMP**

Dollars in millions

Alteration type number	Description	Work day estimate	Estimated cost
DDG 0113	Redesign the CIC: Provides a consolidated rearrangement of the Combat Information Center and sonar control area to accommodate major combat system upgrades in the combat direction, antiair warfare, antisubmarine warfare, and communications subsystems.	8,000	\$3.1

^aSeveral submarines received this alteration. The two different alteration numbers are for the two types, or classes, of submarines on which the K-alt was installed. The work day estimates ranged from 16,000 to 32,500 days and the cost estimates from \$7.7 million to \$14.8 million.

^bThis alteration was installed on both frigates and destroyers. The estimate to install the K-alt on the frigates was 30,250 days at an estimated cost of \$10.9 million. The estimate for the destroyers was 18,000 days at an estimate cost of \$8.3 million.

^cThis alteration was installed on several submarines. Although the number of days estimated was the same for all of the submarines, the cost estimates varied.

Ships Reviewed in Detail

The fiscal year 1987 FMP included 2,278 K-alts to be installed on 244 ships. We selected 24 of these ships for detailed review. Table III.1 lists these ships and indicates whether the planned K-alts were installed.

Table III.1: Twenty-Four Ships in the Fiscal Year FMP Reviewed in Detail

Dollars in millions

Ship type	Ship number	Number of K-alts		Budget
		Planned	Installed	
Command ^a	AGF-11	4	4	\$0.3
Auxiliary	AOE-1	14	12	5.3
Cruiser	CG-17	30	28	19.6
Carrier ^b	CV-43	6	6	1.0 ^c
Carrier	CV-66	74	74	70.7
Carrier	CV-67	27	21	12.9
Carrier	CVN-68	27	22	6.9
Destroyer	DD-965	53	50	26.5
Destroyer	DD-971	16	12	2.9
Destroyer	DDG-16	6	5	1.1
Destroyer	DDG-41	7	7	1.4
Frigate	FF-1045	16	15	3.4
Frigate	FF-1062	3	2	1.3
Command ^d	LCC-20	6	6	4.6
Amphibious	LHA-1	26	22	19.0
Amphibious	LST-1195	4	4	0.8
Submarine	SSBN-624	34	32	5.3 ^c
Submarine	SSN-652	39	32	20.1
Submarine	SSN-668	40	33	21.5
Submarine	SSN-669	41	35	20.6
Submarine	SSN-670	38	26	16.4
Submarine	SSN-681	16	14	8.9 ^c
Submarine	SSN-697	25	19	30.2
Submarine	SSN-721	1	1	7.5
Total		553	482	\$308.2

^aCommand ship for the Third Fleet.

^bAircraft carrier.

^cAdded to the fiscal year 1987 FMP after the budget was submitted to the Congress. These estimates are from the FMP Management Office, as of August 1988.

^dCommand ship for the Second Fleet.

**Appendix III
Ships Reviewed in Detail**

Of these 24 ships, 17 had K-altS authorized that were not installed as part of the fiscal year 1987 FMP, including four K-altS that were installed with maintenance funds provided by the Type Commanders of the Atlantic and Pacific Fleet Commands because the Naval Sea Systems Command had deleted the installation funds for them from the 1987 FMP budget. The reasons K-altS were not installed as planned are listed in table III.2.

Table III.2: Reasons K-AltS Were Not Installed on the 24 Ships Reviewed in Detail

Reason	Percent
Material availability problems	32
Alteration already installed	20
Lack of FMP funds	14
Design problems	10
K-alt not required	6
Other	7
Reason not determined	11

Questionnaire Results

From the responses to the questionnaire we developed and sent to the Navy offices responsible for installing K-alts, we determined whether the time to complete work on each ship was lengthened due to problems with the installation of K-alts. We obtained this information for the 212 ships with 217 availabilities (maintenance periods) included in the fiscal year 1987 FMP for which some modernization work was done. (We did not obtain information for the 32 ships for which all work was canceled or moved to another fiscal year or for the 53 ships added to the fiscal year 1987 FMP.) We asked the shipyards to indicate the actual completion date for the ship and, if it had been delayed, whether the delay was caused by problems with the K-alts. Table IV.1 shows the results obtained from the questionnaires.

Table IV.1: Ships Delayed Due to Problems With K-Alt Installations

Dollars in millions

	Ship availabilities		K-alts	
	Number	Percent	Amount	Percent
Completed on time or early	98	45	\$183	21
Completion date delayed				
Not due to K-alts	84	39	253	29
Due to K-alts	32	15	413	48
Reason unknown	3	1	14	2
Total	217		\$863	

Table IV.2 indicates that ships with the most expensive packages of K-alts were the ones delayed because of K-alt installations.

Table IV.2: Length of Delays Due to Problems With K-Alts

Dollars in millions

	Ship availabilities		K-alts	
	Number	Percent	Amount	Percent
1 to 31 days	13	6	\$55	6
32 to 62 days	11	5	166	19
63 days or more	6	3	119	14
Unknown number of days	2	1	73	8
Total	32		\$413	

Ships Decommissioned After Modernization

Nine frigates were decommissioned in fiscal years 1988 and 1989 after the Navy had spent almost \$9.9 million installing new equipment on them as part of the fiscal year 1987 FMP. Table V.1 shows these ships and the amount spent to install the new equipment.

Table V.1: Ships Decommissioned

Ship number	Fiscal year ship was decommissioned	Fiscal year 1987 FMP funds spent
FFG-1	1988	\$1,033,351
FFG-4	1988	365,320
FFG-6	1989	1,516,012
FF-1040	1989	1,329,602
FF-1041	1988	512,066
FF-1043	1988	265,402
FF-1044	1989	1,171,218
FF-1045	1989	3,052,982
FF-1047	1989	618,573
Total		\$9,864,526

Key Events in Planning and Installing K-Alts

The FMP encompasses a combination of integrated, but separate phases for planning, programming, budgeting, and installing military and technical improvements to the Navy's ships. Although the modernization of each ship is different, most ship modernization projects take from 3 to 5 years from planning to installation.

Planning and installing modernization projects can be difficult because many factors outside the control of the FMP managers affect the program. Decisions regarding the modernization needs of ships are made jointly by the Chief of Naval Operations, the Atlantic and Pacific Fleets, and the Naval Sea Systems Command. Priorities for modernizing ships are set at least annually and changed on an ad hoc basis as needed. Many factors can change the Navy's ship modernization priorities, including increases or decreases in the funds budgeted for modernization; emerging requirements involving operational, safety, or security needs; and decisions to decommission ships or ship classes. Other factors that directly affect the FMP include ship maintenance schedules, equipment availability, contractor performance (timeliness and quality), the competitive bidding process for modernization contracts, shipyard capacity, ship configuration control and standardization within ship classes, other agency requirements (e.g., the Environmental Protection Agency and the Nuclear Regulatory Commission), and the operational needs of the fleets.

Phase I: Define Alteration Content

During this phase, the cost and feasibility of modernizing ships is studied. The technical specifications of the ship, the equipment to be installed, and other material needs are identified. Cost estimates are also prepared. The alterations are entered into the FMP management information system data base, and the Ship Alteration Record, which is the basis for installation design efforts, is prepared.

Integrated logistic support elements are identified in the Ship Alteration Record, which also include supply support, technical documentation, support equipment, maintenance planning, and personnel training. These are procured with the equipment and revised to suit the ship and installation.

Phase II: Programming and Budgeting

In this phase, K-alts are prioritized, according to urgency of Navy needs, and included in the budget projection. The FMP Program Management Office prepares the budget in accordance with the Navy Comptroller's guidance. After approval by the Office of Secretary of Defense and the

Office of Management and Budget, the FMP is included in the President's budget. The approved budget is the basis for the FMP execution document that lists the K-alts programmed for each ship. The execution document is published in August before the start of each year's program.

Phase III: Ship Alteration Installation Planning

During this phase, ship installation drawings are prepared, and needed material is identified and ordered. Installation drawings are specific to each ship installation, but follow-on installations for ships of the same class are primarily revisions of the initial plan. Completion of installation drawings is required no later than 12 months before the date that the ship is available for maintenance. The FMP manual stresses the importance of meeting this date for ships that are to be modernized in private as well as public shipyards.

For private shipyards, the plans form the basis for competing shipyards to develop their bid packages. In the public sector, material procurement and planning require a minimum of 12 months.

Phase IV: Ship Alteration Implementation

In this final phase of the planning process, K-alts are reviewed by FMP managers and authorized for installation by Naval Sea Systems Command. Alteration verification conferences are held to review K-alts 12 to 15 months before installation. Emphasis is placed on identifying risks to successful installation that might result from design, material, or logistics support deficiencies. Decisions are made to defer high-risk alterations or to take action to reduce risks to an acceptable level.

Naval Sea Systems Command issues letters authorizing shipyards to install the K-alts. The authorizing letter is to arrive at the installing shipyard at least 12 months before the start of maintenance.

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